

TEXAS SOLAR AND PRIVATE GENERATION

Three options for installing private solar and other forms of generation are available under Texas electric rules for home and small business owners. This package contains contact information, a diagram detailing the interconnection options, a Q&A and an application form.

Electric rules dictating interconnection options in Texas are complex.¹ That's why it's worth taking the time to understand how solar and other forms of private generation work before committing to a particular type of installation.

In addition to understanding your options, all forms of private generation – from photovoltaic panels and wind turbines to engines and batteries – must be registered with Xcel Energy in advance of installation if they interconnect in any way to Xcel Energy.

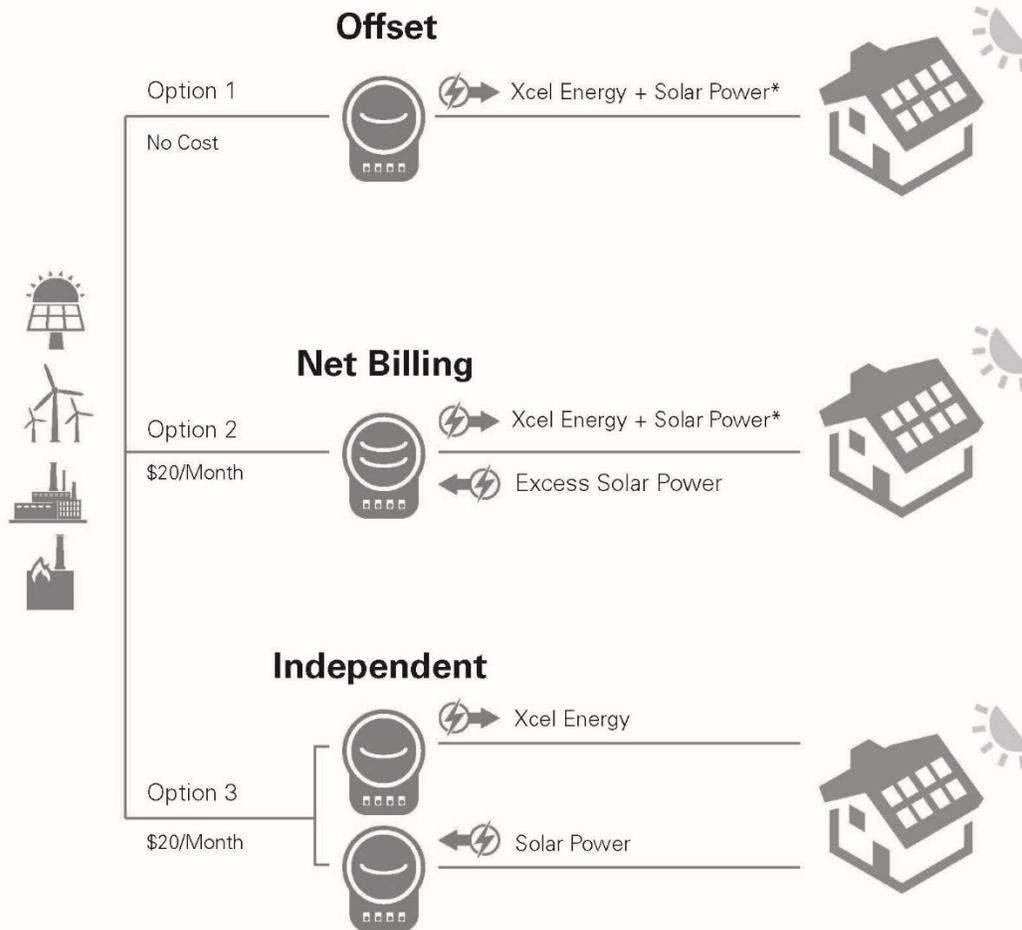
Total: 8 pages + application

DETAILS: TEXAS INTERCONNECTION

Three options for homeowners to consider when installing private generation

TEXAS PRIVATE GENERATION INTERCONNECTION OPTIONS

INFORMATION SHEET
TEXAS



*or any form of qualifying distributed generation (DG)

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EXPLAINING TEXAS INTERCONNECTIONS

Understanding your private generation options in Texas and working with Xcel Energy throughout the interconnection process are critical to your satisfaction.²

Following are detailed explanations for the three Texas interconnection options. Please note: *Choosing to install solar or other private generation in Texas should hinge on your personal desires and not on any promise of payment or cost recovery.*

Offset (Option 1): Customer-generated power simply replaces or offsets the power supplied by Xcel Energy. The electricity you produce on a moment-by-moment basis reduces your total energy use, helping to immediately lower your bill. While the meter does not reverse when your generation exceeds your power consumption, the power you replace is power you do not have to purchase at a retail per kilowatt-hour rate.

Net Billing (Option 2): Your private power replaces the electricity supplied by Xcel Energy, as in Option 1, plus any excess generation earns a bill credit (excess generation occurs when your private power system produces more electricity than your home or business consumes). The credit is determined by metering excess power in kilowatt-hours and multiplying it by the power rate or “fuel cost factor.” This factor, which varies monthly dependent on customer class and Xcel Energy’s systemwide fuel costs, is published on xcelenergy.com.^{*} The “Net Billing” effect is realized when credit for excess private generation is subtracted from the total Xcel Energy bill. Option 2 carries a \$20 monthly service fee, requiring a minimum amount of excess electricity to be produced to cover the fee. (See “What is the fuel cost factor/power rate?” in the Q&A).

Independent (Option 3): Two separate meters are installed: one measuring electricity supplied by Xcel Energy and the other measuring all privately generated power. Under this choice, the customer's generation is pushed directly onto the grid and not used to offset the power consumed from Xcel Energy. The private generation is metered, measured in kilowatt-hours and multiplied by the power rate or "fuel cost factor" published monthly on xcelenergy.com.^{*} The power rate can vary month-to-month depending on Xcel Energy's systemwide fuel costs, but is typically much lower than what power costs off the energy grid. Therefore, Option 3 is not typically recommended due to the low return rate. A monthly \$20 service fee applies to this option. (See "*What is the fuel cost factor/power rate?*" in the Q&A).

**The Fuel cost factor can be found on xcelenergy.com > Company > Rates and Regulations > Rates > Texas Rates, Rights and Service Rules*

Note: Working with Xcel Energy throughout the application process will help you determine the system that best meets your goals. You must register your system with Xcel Energy to interconnect.²

Q&A: Private generation in Texas

How do I know which solar/generation option to choose?

Choosing to install solar or other private generation in Texas should hinge on your personal desires and not on any promise of payment or cost recovery. Tariffs allow Xcel Energy to credit customers "avoided fuel costs" for excess generation.¹ But the credited power factor or fuel cost factor does not reflect what customers pay Xcel Energy for each kilowatt-hour of electricity since fuel makes up only a minor portion of the company's total costs to deliver safe, reliable electricity to customers (see "*What is the fuel cost factor/power rate?*" and "*What is net metering?*").

What is the fuel cost factor/power rate?

The power rate, calculated monthly, is used to determine the per kilowatt-hour credit for any excess generation produced by a customer with a qualifying solar or private generation system. The power rate, which may vary per customer class, is derived from actual fuel costs to power traditional generating plants serving Texas customers. Xcel Energy issues a power rate credit to customers generating electricity because it avoids fuel costs that would have otherwise been incurred supplying electricity. (Note: the company passes through all fuel costs with no mark-up to customers.) The fuel savings reflected by the fuel cost factor comprise only a small portion of the total retail electricity cost per kilowatt-hour. That's because the fuel savings gained by private generation constitute only a minor portion of the company's total costs to deliver safe, reliable and adequate electricity to all customers during peak demand periods.

What is net metering?

Net metering is a billing mechanism that credits private generation at retail rates for the electricity pushed onto the grid. For example, if a residential customer has a photovoltaic system on their roof that generates more electricity than the home uses during daylight hours, the extra electricity pushed back onto the grid earns the same per kilowatt-hour rate as the utility charges that customer for electricity. Different states may have payment caps or other rules, but Texas tariffs do not allow retail net metering. The state rules do allow excess electricity to be compensated at a lower "wholesale" per kilowatt-hour rate – the fuel cost factor or power rate. The power rate reflects the benefit of electricity produced by a customer without subsidizing that customer's production. Specifically, the power factor credit does not reflect the full cost to deliver reliable, safe electricity during peak demand to all customers.

How much can I expect to make from my solar or private generation production?

To potentially realize a bill credit for your solar or private generation production, you must select Option 2, *Net Billing*, or Option 3, *Independent*. Both options carry a \$20 monthly service fee.³ Under these two options, a customer's excess generation is credited at the per kilowatt-hour fuel cost factor or power rate (see "What is the fuel cost factor/power rate?").

- Whether the \$20 fee pays for itself depends on the amount of electricity produced and a particular month's fuel cost factor. Using 2019 power rates,

an Option 2 or Option 3 customer would need to produce about 1,200 kilowatt-hours per month to cover the \$20 monthly service fee.

- The *Net Billing* Option 2 benefits the customer similarly to Option 1 because electricity use is offset – that is, the customer produces electricity that otherwise would be purchased from Xcel Energy at the retail rate. Option 2 gives customers the opportunity to earn a credit on their electric bill. However, a large amount of excess electricity needs to be produced to cover the monthly \$20 service fee.
- The *Independent* Option 3 customer pushes all solar/private generation directly onto the grid. The electricity produced privately is paid at the wholesale fuel cost factor or power rate. Option 3 is not recommended for customers seeking to recover the cost of private generation. That's because offsetting electricity from Xcel Energy, charged at the retail rate, is financially more valuable than getting paid the lower power rate per kilowatt-hour of electricity produced. The dynamics may change for solar/private generation systems over approximately 100 kilowatts.

Are there infrastructure costs and who pays?

Xcel Energy's responsibility extends to the meter. Customers are responsible for costs behind the meter. However, if the system you install requires an upgrade to the local Xcel Energy's grid, you may incur additional costs. While it's rare a residential-size solar or private generation system requires a neighborhood grid upgrade, you must register your system with Xcel Energy to interconnect. Working with Xcel Energy throughout the application process will help assure compatibility – and could help you determine the system that best meets your goals.

Does the meter run backward when a customer generates excess electricity?

No. Different types of meters measure electricity in different ways, but today's meters don't run backward. Modern meters measure the flow of electricity, registering electrons no matter which way they flow through the meter. The meter in Option 2's *Net Billing*, for example, has two gauges, one measuring power consumed from Xcel Energy and the other measuring a customer's excess power pushed back onto the grid.

Does Xcel Energy's meter tell me how much electricity my solar/private generation system produces?

It depends. Xcel Energy deploys different types of meters depending on a customer's solar/private generation configuration. Meters used in Options 1 and 2 do not measure your total production. The meter used for Offset Option 1 behaves a lot like a regular meter, measuring incoming electricity, but does not measure electricity flowing back onto the grid. Net Billing in Option 2 utilizes a single meter with two readings, one measuring power from Xcel Energy and the other measuring only the excess solar/private generation. Option 3 uses two separate meters: One measures consumption from Xcel Energy and the other production from the customer's private generation. Many solar panel brands and other forms of generation come with a separate meter to measure total production and minute-by-minute system performance.

Does the size of my solar energy center matter?

A 10-kilowatt solar system would be considered a large home-based energy center. A solar plant of this size would consist of anywhere from 31 to 40 photovoltaic panels, depending on panel watt rating, and take up to 700 square feet of roof space. While panel size and weight, and homeowner electricity use patterns vary greatly, a general rule of thumb on installation size is about 2-watts of solar capacity for every square foot of home. A 2,000-square-foot "average" home, for example, might find a 4-kilowatt (4,000 watt) solar energy center with 12-18 solar panels ideal, although evaluating your private generation goals against Texas interconnection rules is critical. Texas grid interconnection rules change once a solar energy center reaches 100-kilowatts or higher. Regardless of the size, private solar and other forms of generation must be registered with Xcel Energy in advance of installation if they interconnect in any way to Xcel Energy.

CONTACT

For questions about solar energy and private generation in Texas, contact Steven Hudson, principal area engineer:

Email: Steven.Hudson@xcelenergy.com

Phone: 806-378-2165

¹Public Utility Commission of Texas rules provide for three metering and billing options for customer-owned generation through Xcel Energy rate schedule IV-86 (PUCT Substantive Rule 25.242, found at 16 Texas Administrative Code § 25.242).

²Be sure your inverter, converter, controller and other private generation interconnection equipment meet universal Underwriters Laboratories or Institute of Electrical and Electronics Engineers pre-certification standards UL-1741 and IEEE 1547.1 (required frequency 60 Hz).

³Option 1, Offset, does not carry a service fee. Customers benefit by replacing or offsetting power that would otherwise be purchased from Xcel Energy at a retail rate.

Texas



INTERCONNECTING PRIVATE GENERATION

The following information shall be supplied by the customer or customer's designated representative. Applicable information must be complete to assure accurate evaluation of interconnection with the utility system.

For assistance, please contact Steven Hudson, principal area engineer

Email: Steven.Hudson@xcelenergy.com

Phone: 806.378.2165

Note: Be sure your inverter, converter, controller and interconnection equipment meet universal Underwriters Laboratories or Institute of Electrical and Electronics Engineers pre-certification standards UL-1741 and IEEE 1547.1 (required frequency 60 Hz).

APPLICATION FOR INTERCONNECTION AND PARALLEL OPERATION

Customer name _____

Service point _____

Street address (home, business, facility) _____

City _____ State _____ ZIP _____

Contact name _____

Phone _____ Email _____

Information prepared and submitted by (if different than contact)

Name _____

Address _____

Signature _____

Generator information

Number of individual units (photovoltaic panels, turbines, engines, batteries, etc.) _____

Panel manufacturer and model number, if applicable _____

Inverter manufacturer and model number, if applicable _____

Type of distributed generation to be produced (synchronous, induction, inverter) _____

'Fuel' source (solar, wind, natural gas, etc.) _____

Kilowatt rating (total system DC rating, 95 F at location) _____

Kilovolt-ampere rating (total system AC rating, 95 F at location) _____

Expected start-up date (energization) _____

Normal operation of interconnected private generation is expected to supply power to meet baseload, offset power consumption (demand management), provide standby or back-up power, other (please describe) _____

One-line diagram attached: Yes (document title) _____ No _____

Precertification label or type number (e.g., UL-1741, IEEE 1547.1) _____

Layout sketch showing lockable "visible" disconnect device attached: Yes (document title) _____ No _____

Which interconnection option do you prefer (see diagram labeled TEXAS PRIVATE GENERATION INTERCONNECTION OPTIONS)

Option 1 _____ Option 2 _____ Option 3 _____

If you plan to export electricity, do you have an expected power export estimate (kilowatt-hours per day you expect to push onto the grid) _____ kWh

Customer Authorized Release of Information

By signing below, customer authorizes Xcel Energy's Southwestern Public Service Company to release customer's proprietary information to the extent necessary to process this application:

Customer signature _____ Date _____

Please provide with application (check all that apply):

- Complete copy of all technical manuals.
- One-line diagram of the system and any other applicable schematic drawings.
- A drawing of the facility where you intend to install the system. For instance, provide the house/business location in relation to our electric service, where the private generation will be installed, and any pertinent information that provides our engineer a helpful visual description before he makes a site visit.

Return completed application to:

**Resource Planning Dept.
790 Buchanan St, 7th Floor
Amarillo, TX 79101**

Email: **Steven.Hudson@xcelenergy.com**

Phone: **806.378.2165**

See "Texas solar and private generation" in information packet and on xcelenergy.com for interconnection options and definitions.

Source:

Southwestern Public Service Company
Electric Tariff
Section No. IV
Sheet No. IV-150
Revision No. 6

¹Commission rules provide for three metering and billing options for customer-owned generation through Xcel Energy rate schedule IV-86 (PUCT Substantive Rule 25.242, found at 16 Texas Administrative Code § 25.242).